Configuring Ethernet, FDDI, and Token Ring Services

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About This Guide

If you are responsible for configuring Ethernet, FDDI, and token ring services on a Bay Networks® router, you need to read this guide.

You can now use the Bay Command Console (BCC™) to configure these services on a router. In this guide, you will find instructions for using both the BCC and Site Manager. Some parameters you cannot yet configure with the BCC; in these cases, you must use Site Manager.

If you want to	Go to
Gain access to line services	Chapter 1
Learn about and customize Ethernet line services	Chapter 2
Learn about and customize FDDI line services	Chapter 3
Learn about and customize token ring line services	Chapter 4
Obtain reference information about all line service parameters	Appendix A
Obtain a listing of all line service parameters and their defaults	Appendix B

Before You Begin

Before using this guide with a new router, you must complete the following procedures:

- Install the router (refer to the installation manual that came with your router).
- Connect the router to the network and create a pilot configuration file (refer to *Quick-Starting Routers*, *Configuring BayStack Remote Access*, or *Connecting ASN Routers to a Network)*.

Make sure that you are running the latest version of Bay Networks Site Manager and router software. For instructions, refer to *Upgrading Routers from Version 7–11.xx to Version 12.00*.

Conventions

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: if command syntax is **ping** *<ip_address>*, you enter **ping 192.32.10.12**
bold text	Indicates text that you need to enter, command names, and buttons in menu paths. Example: Enter **wfsm &**
	Example: Use the **dinfo** command.
	Example: ATM DXI > Interfaces > **PVCs** identifies the PVCs button in the window that appears when you select the Interfaces option from the ATM DXI menu.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
`screen text`	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
separator (>)	Separates menu and option names in instructions and indicates internal pin-to-pin wire connections. Example: Protocols > AppleTalk identifies the AppleTalk option in the Protocols menu.
	Example: Pin 7 > 19 > 20
vertical line (|)	Indicates that you enter only one of the parts of the command. The vertical line separates choices. Do not type the vertical line when entering the command. Example: If the command syntax is
	show at routes | **nets**, you enter either **show at routes** or **show at nets**, but not both.

Acronyms

BCC	Bay Command Console
BofL	Breath of Life (message or packet)
CMT	Connection Management
CSMA/CD	carrier sense multiple access with collision detection
FDDI	Fiber Distributed Data Interface
IP	Internet Protocol
IPX	Internet Packet Exchange Protocol
ISDN	Integrated Services Digital Network
ISO	International Organization for Standardization
ITU-T	International Telecommunication Union–Telecommunications (formerly CCITT)
LAN	local area network
LEM	link error monitor
LER	link error rate
LLC	Logical Link Control
MAC	media access control
MAU	media access unit
MDI-X	Media-Dependent Interface with Crossover
MIB	management information base
MIC	Media Interface Connector
MII	Media Independent Interface
NIF	neighbor information frame
NSA	Network Service Address
OSI	Open Systems Interconnection
PC	physical connection
PHY	Physical Layer
PMD	Physical Layer Media Dependent
RMT	Ring Management
SMT	Station Management
STP	shielded twisted pair
SRF	status report frame
TPE	twisted pair Ethernet

TTRT	token target rotation time
TVX	valid transmission time
TTP	Timed-Token Protocol
UTP	unshielded twisted pair
WAN	wide area network
XNS	Xerox Networking System

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Tokyo, Japan	81-3-5402-0180	81-3-5402-0173

Chapter 1
Getting Started

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About Line Services	1-1
Accessing Line Services	1-2
Customizing Line Services	1-5

About Line Services

Ethernet, FDDI, and token ring services comprise the physical and data link layer (*line*) services for configured LAN circuits on a Bay Networks router. This chapter shows you how to access the those services on a Bay Networks router.

Note: In the OSI internetworking model, the *physical layer* manages the transmission of bits across the physical media (for example, cable or modem interface); the physical layer protocol defines the electrical and mechanical interface. The *data link layer* defines the procedures for transferring data accurately and reliably across the physical layer.

This guide assumes that the router's configuration file includes Ethernet, FDDI, or token ring network circuits. See *Configuring and Managing Routers with Site Manager* for information on adding circuits.

Accessing Line Services

When you add an Ethernet, FDDI, or token ring circuit, the router software automatically sets default values for line services.

Using the BCC

Using the **show config** command, you can view the current configuration of a Bay Networks router, including the location of configured line services

Note: This guide assumes that you are working with a router configuration file that already contains the appropriate WAN circuits for the hardware configuration. See *Configuring and Managing Routers with Site Manager* for information about adding circuits to a configuration file.

Using the BCC, issue the **show config** command to locate configured line services, as follows:

box# **show config**

```
box type frecn
    board slot 13
      type qenf
  back
  console portnum 1
      prompt {"%slot%:"}
      auto-manager-script automgr.bat
      auto-user-script autouser.bat
  back
  ethernet slot 13 connector 1
      circuit-name E131
    auto-neg
    back
    ip address 192.168.133.114 mask 255.255.255.224
      arp
      back
      rip
      back
    back
  back
    fddi slot 11 connector 1
      circuit-name F111
    ip address 192.168.5.2 mask 255.255.255.0
      arp
      back
```

```
    back
  back
tokenring slot 9 connector 1
      circuit-name O91
      speed 4Meg
    ip address 192.168.2.1 mask 255.255.255.0
      arp
      back
      rip
      back
    back
  back
```

To access line services, at the top-level box prompt use the output from the show config command and enter:

interface_type **slot** *slot_number* **connector** *connector_number*

interface_type	Name of a physical interface on the router
slot_number	Number of the slot on which the link module is located
connector_number	Number of a connector on the link module

For example, to access the Ethernet line services on slot 13, connector 1 as shown in the output from the **show config** command above, navigate to the top-level box prompt and enter:

box# **ethernet slot 13 connector 1**

To display the current values for the Ethernet line services, enter:

info

```
on box
state enabled
circuit-name E132
slot 13
connector 2
bofl enable
bofl-timeout 5
hardware-filter disable
transmit-queue-length 0
receive-queue-length 0
bofl-retries 5
bofl-tmo-divisor 1
bofl-number 0
```

Using Site Manager

To view line services using Site Manager, complete the tasks in the following table.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose **Circuits**.	
2. Choose **Edit Circuits**.	The Circuit List window opens, listing all available circuit types.
3. Choose **the circuit for which you want to edit line service parameters**, using these Site Manager abbreviations to guide you: E - Ethernet circuit type F - FDDI circuit type O - token ring circuit type	
4. Choose **Edit**.	The Circuit Definition window opens.
5. Choose **Lines**.	
6. Choose **Edit Lines**.	The Edit Lines window opens and lists the existing lines by slot number and connector name.
7. Choose **the type of line you want to edit**.	
8. Choose **Edit**.	Depending on the type of circuit you selected in step 7, Site Manager displays the window showing the circuit's line details.

Note: For many circuit types, you can bypass steps 2 to 6 by clicking on the configured connector in the Configuration Manager window, and then clicking on Edit Line in the resulting window.

Customizing Line Services

When you add an Ethernet, FDDI, or token ring circuit, the line service parameters take default values that suit many networks. You can, however, modify those values to suit your own network composition and requirements.

The *circuit type* determines how you customize line services. To learn how to customize line parameters for specific circuit types, go to the sources indicated in the following table.

Line Type	**Go To**
Ethernet	Chapter 2
FDDI	Chapter 3
Token ring	Chapter 4
ATM FRE®-2, ATM ARE	*Configuring ATM Services*
ATM DXI, E1, HSSI, T1, synchronous, asynchronous, LAPB, MCE1, and MCT1	*Configuring WAN Line Services*

Chapter 2
Configuring Ethernet Services

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Summary of Ethernet Services

This chapter describes how to customize the physical layer for Ethernet router interfaces. Table 2-1 shows the Ethernet functions you can configure. A check mark (✓) across from a particular function means that you can configure that function with the tool that is checked off.

Table 2-1. Ethernet Functions

Function	BCC	Site Manager
Enabling or Disabling an Ethernet Interface	✓	✓
Enabling or Disabling BofL Messages	✓	✓
Setting the BofL Timeout	✓	✓
Setting BofL Retries	✓	
Setting the BofL Timeout Divisor	✓	
Enabling or Disabling Hardware Filtering	✓	
Enabling or Disabling Hardware Filtering	✓	✓
The Transmit Queue Length	✓	
The Receive Queue Length	✓	

About Bay Networks Ethernet Media

The Bay Networks Ethernet/802.3 interface supports IEEE 802.3 and Version 1.0/2.0 Ethernet frame formats. Ethernet circuits use carrier sense multiple access with collision detection (CSMA/CD) to manage access to the physical media in a baseband LAN.

10BASE-T interfaces operate at 10 megabits/second (Mb/s) over twisted wire or coaxial cable. 100BASE-T interfaces (sometimes called Fast Ethernet) operate at 100 Mb/s. Refer to the *Bay Networks Guide to Understanding 100BASE-T* for detailed information.

The following sections describe proprietary features of Bay Networks Fast Ethernet router services, and provide hints and notes for operation:

- 100BASE-T Media
- 100BASE-T Packet Size

100BASE-T Media

Each Bay Networks 100BASE-T router port provides two physical connectors for LAN media:

- Media Dependent Interface (MDI): RJ-45 connector to integral transceiver
- Media Independent Interface (MII): DB-40 connector to an external transceiver

Which connector you use determines the supported features of 100BASE-TX and 100BASE-FX operation (Table 2-2).

Table 2-2. 100BASE-T Features

Operation	Cabling	Physical Interface	Automatic Line Negotation	Full Duplex [a]	Congestion Control *
100BASE-TX (MDI)	Category 5 unshielded twisted pair (UTP) copper	RJ-45 connector	Supported	Supported	Supported
100BASE-FX (MII)	Multimode Fiber optic	DB-40 connector to external transceiver	Not supported	Supported	Not supported
100BASE-TX (MII)	UTP	DB-40 connector to external transceiver	Supported	Not supported	Not supported

a. The current implementation of the Ethernet standard does not address full-duplex operation or congestion control; these are proprietary features.

100BASE-T Packet Size

When using the 100BASE-T link module, larger packet sizes yield better performance than smaller packet sizes. In general, you should configure your application to use the largest packet size possible.

Note: To obtain the highest aggregate throughput, use only one port on a 100BASE-T link module. Demanding high throughput from both ports simultaneously will result in some packet loss, which may decrease the performance of sensitive applications.

Enabling or Disabling an Ethernet Interface

The router enables CSMA/CD services when you add a 10 Mb/s or 100 Mb/s Ethernet circuit to the router configuration file.

You can disable and enable the Ethernet interface without moving physical cabling.

Using the BCC

To enable the Ethernet interface, access an existing Ethernet line service and enter:

enable

To disable the Ethernet interface, access an existing Ethernet line service and enter:

disable

For example, to enable an ethernet interface:

```
box> ethernet slot 13 connector 1
ethernet/13/1> enable
```

Using Site Manager

Complete the tasks in the following table to enable an Ethernet interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose an **XCVR** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit CSMA/CD Parameters window opens.
3. Set the **Enable** parameter. Click on **Help** or see the parameter description on page A-1.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Configuring BofL Messages

For carrier detection on Ethernet circuits, the router sends breath of life (BofL) messages whenever the interface transmitter is idle. When there is no data traffic, BofL messages signify that the Ethernet LAN is up and functioning normally.

These sections describe how to configure BofL transmissions:

- Enabling or Disabling BofL Messages
- Setting the BofL Timeout
- Setting BofL Retries
- Setting the BofL Timeout Divisor

With default values configured, the router declares an Ethernet interface down after 25 seconds (five retries of 5 seconds each) without a successful frame transmission.

Note: When you configure router redundancy on an Ethernet interface, Site Manager automatically adjusts BofL parameters to reduce the time it takes the router to declare an interface down when there is a loss of service. With default router redundancy values configured, the router declares the interface down after 2 seconds (four retries of .05 seconds each).

Enabling or Disabling BofL Messages

With BofL enabled, the router sends polling messages from this Ethernet interface to all systems on the local network.

Note: The router does not send BofL messages if it is already transmitting regular data traffic.

BofL messages are enabled by default on every Ethernet interface. You can disable and enable BofL messages on an interface.

Using the BCC

To enable BofL messages on an Ethernet interface, access an existing Ethernet line service and enter:

bofl enable

To disable BofL messages on an Ethernet interface, access an existing Ethernet line service and enter:

bofl disable

For example, to enable BofL messages:

```
box> ethernet slot 13 connector 1
ethernet/13/1> bofl  enable
```

Using Site Manager

Complete the tasks in the following table to enable or disable BofL messages.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose an **XCVR** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit CSMA/CD Parameters window opens.
3. Set the **BofL Enable** parameter. Click on **Help** or see the parameter description on page A-2.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Setting the BofL Timeout

With BofL enabled, a network timeout will occur if five periods elapse without a successful BofL message transmission. When timeout occurs, the router automatically disables and reenables the Ethernet interface. For example, if you set the BofL timeout interval to 10 seconds, the interface must successfully transmit a BofL message within 50 seconds.

The BofL Timeout interval is 5 seconds by default. You can change the interval of BofL messages to a value from 1 to 60 seconds.

Using the BCC

To change the interval of BofL messages on an Ethernet interface, access an existing Ethernet line service and enter:

bofl-timeout *<integer>*

<integer> is the timeout value expressed in seconds. You can enter any integer value between 1 and 60.

For example, to set the timeout value to 10 seconds:

```
box> ethernet slot 13 connector 1
ethernet/13/1> bofl-timeout 10
```

Using Site Manager

Complete the tasks in the following table to change the interval of BofL messages.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose an **XCVR** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit CSMA/CD Parameters window opens.
3. Set the **BofL Timeout** parameter. Click on **Help** or see the parameter description on page A-2.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Note: In Site Manager, the BofL Timeout parameter is valid only if you set BofL Enable to Enable.

Setting BofL Retries

By default, the router makes five attempts to transmit a BofL message before declaring the Ethernet interface down. With router redundancy enabled, the default is four attempts.

You can specify the number of transmission attempts, from 1 to 60 retries, before the router declares the circuit down. You can only do this by using the BCC.

Using BCC

To specify the number of retransmission attempts, access an existing Ethernet line service and enter:

bofl-retries *<integer>*

<integer> is the number of BofL retries. You can enter any integer value between 1 and 60.

Either accept the default of 5 BofL retries, or specify a value from 1 to 60. Set the number of retransmission attempts in conjunction with the time period between transmission of BofL attempts and the BofL timeout period to decrease or increase the time it takes the router to declare an interface down.

For example, to set the number of BofL retries to 10:

```
box> ethernet slot 13 connector 1
ethernet/13/1> bofl-retries 10
```

Setting the BofL Timeout Divisor

By default, the router uses the value you specify for the BofL timeout period to determine the time period between transmissions of BofL messages from an Ethernet interface. The actual interval between BofL transmissions is the value of the BofL timeout divided by the value of the BofL timeout divisor. When set to the default value of 1, the BofL timeout divisor has no effect on the BofL timeout value. When set to a value greater than 1, the BofL timeout divisor reduces the value of BofL timeout.

When you configure router redundancy on an interface, Bay Networks recommends that you set the value of the BofL timeout divisor to 10 to reduce the time between BofL transmissions, which reduces the time it takes the router to declare a circuit down.

Set the value of this parameter to an integer from 2 to 100 if you want a BofL timeout to be detected in less than 1 second. Leave this parameter set to 1 and use the BofL Timeout parameter for 1- to 5-second timeout values.

For example, with the BofL timeout value set to 5 seconds and the BofL timeout divisor set to 10, the router sends a BofL message every 0.5 seconds (5 divided by 10). With BofL timeout set to 5 seconds and the BofL timeout divisor set to 1, transmissions are every 5 seconds.

You can only set the BofL timeout divisor by using the BCC.

Using the BCC

To set the BofL timeout divisor, access an existing Ethernet line service and enter:

bofl-tmo-divisor *<integer>*

<integer> is a value between 2 and 100.

For example, to set the Bofl timeout divisor to 15:

```
box> ethernet slot 13 connector 1
ethernet/13/1> bofl-tmo-divisor  15
```

Enabling or Disabling Hardware Filtering

When you add an Ethernet circuit for a link module with hardware filter capability, hardware filtering is disabled by default.

With hardware filtering enabled, the Ethernet interface drops local frames instead of copying them into system memory to be processed by the bridge software. *Local frames* are frames that contain both destination and source MAC addresses that the router has learned on the interface. Bridge software teaches the hardware filter which MAC addresses are local to an interface.

Enabling hardware filtering improves bridging software performance, since the router software does not need to determine whether to receive and reject local frames.

You can enable or disable hardware filtering on an interface. Enable hardware filtering only if the Ethernet link module has hardware filters and you enabled bridge software.

Using the BCC

To enable hardware filtering, access an existing Ethernet line service and enter:

hardware-filter enable

To disable hardware filtering, access an existing Ethernet line service and enter:

hardware-filter disable

For example, to enable hardware filtering:

```
box> ethernet slot 13 connector 1
ethernet/13/1> hardware-filter enable
```

Using Site Manager

Complete the tasks in the following table to enable or disable hardware filtering.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose an **XCVR** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit CSMA/CD Parameters window opens.
3. Set the **Hardware Filter** parameter. Click on **Help** or see the parameter description on page A-3.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

The Transmit Queue Length

The transmit queue length determines the number of buffers that can be used to transmit data. Set the value from 0 to 255 to determine the transmit queue length. If you set the value larger than the compiled ring size, the router will truncate the value at that size.

You can set the transmit queue length only by using the BCC.

Using the BCC

To set the transmit queue length, access an existing Ethernet line service and enter:

transmit-queue-length *<integer>*

<integer> is a value between 0 and 255.

For example, to set the transmit queue length to 100:

```
box> ethernet slot 13 connector 1
ethernet/13/1> transmit-queue-length  100
```

The Receive Queue Length

The receive queue length determines the number of buffers that can be used to receive data. Set the value from 0 to 255 to determine the receive queue length. If you set the value larger than the compiled ring size, the router will truncate the value at that size.

You can set the receive queue length only by using the BCC.

Using the BCC

To set the receive queue length, access an existing Ethernet line service and enter:

receive-queue-length *<integer>*

<integer> is a value between 0 and 255.

For example, to set the receive queue length to 100:

```
box> ethernet slot 13 connector 1
ethernet/13/1> receive-queue-length  100
```

Chapter 3
Configuring FDDI Services

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Summary of FDDI Services

This chapter describes how to customize the physical and link layers for FDDI interfaces. Table 3-1 shows the functions you can configure. A check mark (✓) across from a particular function means that you can configure that function with the tool that is checked off.

Table 3-1. FDDI Functions

Function	BCC	Site Manager
Enabling or Disabling a FDDI Interface	✓	✓
Enabling or Disabling BofL Messages	✓	✓
Setting the BofL Interval	✓	✓
Enabling or Disabling Hardware Filtering	✓	✓
Specifying the SMT Connection Policy	✓	✓
Specifying the Neighbor Notification Interval	✓	✓
Specifying the Propagation Expiration Time	✓	✓
Enabling or Disabling Status Report Frames		✓
Enabling or Disabling Duplicate Addressing	✓	✓
Entering User Data		✓
Enabling or Disabling MAC LLC		✓
Specifying the Minimum TVX		✓
Specifying the Maximum TTRT		✓
Specifying the Requested TTRT		✓
Specifying the LER Cutoff		✓
Specifying the LER Alarm		✓
The Transmit Queue Length	✓	
The Receive Queue Length	✓	

About Bay Networks FDDI Media

Fiber Distributed Data Interface (FDDI) comprises a set of ANSI/ISO standards that define a 100 Mb/s, timed token-passing LAN of up to 500 nodes. FDDI is used most often for workgroup, backbone, and backend network configurations that require high bandwidth and performance.

Bay Networks provides FDDI interfaces for multimode or single-mode 100 Mb/s FDDI LANs, including hybrid FDDI link modules for both single-mode and multimode fiber interfaces.

All FDDI interfaces support a Class A dual attachment or a dual-homing Class B single attachment. The FDDI link and net modules include two Media Interface Connector (MIC) plugs as well as one RJ-11 connector for attachment to an optional external optical bypass unit.

Enabling or Disabling a FDDI Interface

The router enables FDDI line services when you add the interface. You can disable and enable the interface without moving physical cables.

Using the BCC

To enable a FDDI interface, start by accessing an existing FDDI line service and enter:

enable

To disable a FDDI interface, access an existing FDDI line service and enter:

disable

For example, to enable a FDDI interface:

```
box> fddi slot 11 connector 1
fddi/11/1> enable
```

Using Site Manager

Complete the tasks in the following table to enable or disable a FDDI interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Set the **Enable** parameter. Click on **Help** or see the parameter description on page page A-3.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Enabling or Disabling BofL Messages

With BofL enabled, the router sends polling messages from this interface to all systems on the local network. BofL messages signify that the FDDI interface is up and functioning normally when there is no data traffic.

If the link becomes unavailable and both this parameter and the LLC Data Enable parameter are enabled, the router disables the LLC interface after the time you specify using the BofL Timeout parameter. When you set this parameter to Disable, the router disables the Logical Link Control (LLC) interface immediately after the link becomes unavailable.

By default, BofL messages are enabled when you add the circuit. You can disable and reenable BofL messages on an FDDI interface.

Using the BCC

To enable BofL on a FDDI interface, access an existing FDDI line service and enter:

bofl enable

To disable BofL on a FDDI interface, access an existing FDDI line service and enter:

bofl disable

For example, to enable BofL on a FDDI interface:

```
box> fddi slot 11 connector 1
fddi/11/1> bofl enable
```

Using Site Manager

Complete the tasks in the following table to enable or disableBofL messages on a FDDI interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Set the **BofL Enable** parameter. Click on **Help** or see the parameter description on page A-4.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Setting the BofL Interval

The BofL interval is the amount of time the router waits before disabling the LLC interface when the link becomes unavailable and BofL is enabled.

By default, the BofL interval is 5 seconds. You can change the interval of BofL messages to a value from 1 to 60 seconds.

Using the BCC

To change the interval of BofL messages, access an existing FDDI line service and enter:

bofl-timeout *<integer>*

<integer> is the timeout value expressed in seconds. You can enter any integer value between 0 and 3600.

For example, to change the BofL interval to 10:

```
box> fddi slot 11 connector 1
fddi/11/1> bofl-timeout  10
```

Using Site Manager

Complete the tasks in the following table to change the interval of BofL messages.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose Edit Line.	The Edit FDDI Parameters window opens.
3. Set the **BofL Timeout** parameter. Click on Help or see the parameter description on page A-4.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Enabling or Disabling Hardware Filtering

When you add a FDDI circuit for a link module with hardware filter capability, hardware filtering is disabled by default.

With hardware filtering enabled, the FDDI interface drops local frames instead of copying them into system memory to be processed by the bridge software. *Local frames* are frames that contain both destination and source media access control (MAC) addresses that the router has learned on the interface. Bridge software teaches the hardware filter which MAC addresses are local to an interface.

Enabling hardware filtering improves bridging software performance, since the router software does not need to determine whether to receive and reject local frames.

You can enable or disable hardware filtering on an interface. Enable hardware filtering only if the FDDI link module has hardware filters and you enabled bridge software.

Using the BCC

To enable hardware filtering, access an existing FDDI line service and enter:

hardware-filter enable

To disable hardware filtering, access an existing FDDI line service and enter:

hardware-filter disable

For example, to enable hardware filtering:

```
box> fddi slot 11 connector 1
fddi/11/1> hardware-filter enable
```

Using Site Manager

Complete the tasks in the following table to enable or disable hardware filtering on a FDDI interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Set the **Hardware Filter** parameter. Click on **Help** or see the parameter description on page A-5.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Editing FDDI SMT Attributes

The FDDI Station Management (SMT) standard defines the protocols for managing the Physical Layer Media Dependent (PMD), the Physical Layer protocol (PHY), and the media access control (MAC) components of FDDI. The SMT protocols monitor and control the activity of each node on the ring. Bay Networks routers support Version 7.2 of the SMT protocol. SMT contains three components:

- Connection Management (CMT)
- Ring Management (RMT)
- SMT frame services

Caution: Changing any of the FDDI Advanced Attributes parameters affects the operation of your FDDI network. Before modifying these parameters, you should understand how to use them to improve network performance.

The following sections describe how you can configure SMT.

Specifying the SMT Connection Policy

A FDDI station sets the corresponding policy for each of the connection types that it wants to reject. The policy descriptor takes the form “rejectX-Y” where X denotes the physical connection (PC) type of the local port, and Y denotes the PC type of the neighbor port.

X and Y can have the following values:

- A -- Indicates that the port is a dual-attachment station or concentrator that attaches to the primary IN and the secondary OUT when attaching to the dual FDDI ring
- B -- Indicates that the port is a dual-attachment station or concentrator that attaches to the secondary IN and the primary OUT when attaching to the dual FDDI ring
- S -- Indicates a port in a single-attachment station or concentrator
- M -- Indicates a port in a concentrator that serves as a master to a connected station or concentrator

To set the connection policies that you want this line to reject, you specify a status word with a value from 0x0 to 0xFFFF.

Use the following formula to determine the value of the status word:

1. Start with a value of zero for the status word (all bits set to 0).
2. For each connection policy that you want the node to reject, add to the status word value the number 2 raised to a power specified in Table 3-2. This is equivalent to setting a bit to 1 for each policy that you want the node to reject.

You set the status word value to reflect local connection policies. Setting a particular connection policy does not necessarily mean that the station will reject the connection. The SMT standard requires that both sides of the connection must agree to reject, or else *both* sides must accept, the connection.

Note: The SMT standard requires that you set Bit 15 (rejectM-M) to 1.

Table 3-2 lists the powers and the bits for each policy range.

Table 3-2. SMT Connection Policy Values

Policy	Power (Bit Number)	Policy	Power (Bit Number)
rejectA-A	0	rejectS-A	8
rejectA-B	1	rejectS-B	9
rejectA-S	2	rejectS-S	10
rejectA-M	3	rejectS-M	11
rejectB-A	4	rejectM-A	12
rejectB-B	5	rejectM-B	13
rejectB-S	6	rejectM-S	14
rejectB-M	7	rejectM-M	15

Figure 3-1 shows the default connection policy, status word 0xFF65.

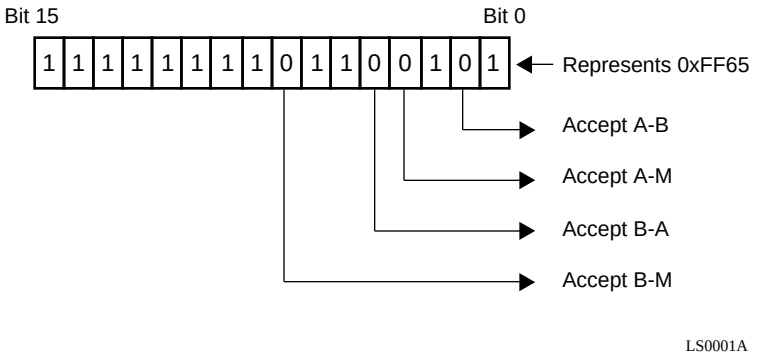

Figure 3-1. Default Connection Policy Status Word

Using the BCC

To set the SMT Connection Policy, access an existing FDDI line service and enter:

reject-policy *<legal value>*

<legal value> is any of the values listed in Figure 3-1.

For example, to set the SMT Connection Policy:

```
box> fddi slot 11 connector 1
fddi/11/1> reject-policy a-a
```

Using Site Manager

Complete the tasks in the following table to set the SMT Connection Policy.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **SMT Attributes**.	The FDDI SMT Attributes window opens.
5. Set the **Connection Policy** parameter. Click on **Help** or see the parameter description on page A-6.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying the Neighbor Notification Interval

Neighbor information frames (NIFs) identify the upstream and downstream neighbors of each node. A Bay Networks station issues a response to the sender of a NIF frame and generates NIF requests as part of the neighbor notification process.

You can set the interval between successful iterations of the Neighbor Notification Protocol on an interface to a value from 2 to 30 seconds. By default, the interval is 22 seconds. This interval:

- Determines the MAC addresses of the upstream and downstream neighbors

- Detects duplicate MAC addresses on the ring
- Generates periodic “keepalive” traffic that verifies the local MAC transmit and receive paths

Using the BCC

To set the Neighbor Notification interval, access an existing FDDI line service and enter:

neighbor-notify-time *<integer>*

<integer> is the neighbor notification interval value expressed in seconds. You can enter any integer value between 2 and 30.

For example, to set the Neighbor Notification interval to 10:

```
box> fddi slot 11 connector 1
fddi/11/1> neighbor-notify-time  10
```

Using Site Manager

Complete the tasks in the following table to set the Neighbor Notification interval.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **SMT Attributes**.	The FDDI SMT Attributes window opens.
5. Set the **T_Notify Timeout** parameter. Click on **Help** or see the parameter description on page A-6.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying the Propagation Expiration Time

A trace is a diagnostic function that isolates a fault on the ring. By default, the maximum propagation time for a trace on a FDDI topology is 7 seconds. You can set the propagation expiration time to a value from 6001 to 256000 milliseconds (ms).

Using the BCC

To set the propagation expiration time, access an existing FDDI line service and enter:

token-rotation-time *<integer>*

<integer> is the propagation expiration time expressed in seconds.

For example, to set the propagation expiration time to 10:

```
box> fddi slot 11 connector 1
fddi/11/1> token-rotation-time  10
```

Using Site Manager

Complete the tasks in the following table to set the propagation expiration time.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **SMT Attributes**.	The FDDI SMT Attributes window opens.
5. Set the **Trace Max Expiration (ms)** parameter. Click on **Help** or see the parameter description on page A-7.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.

(continued)

Site Manager Procedure *(continued)*	
You do this	**System responds**
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Enabling or Disabling Status Report Frames

Status report frames (SRFs) allow the Status Report protocol to report node conditions and events. A *condition* occurs when a node enters a specific state (for example, duplicate address detected). An *event* is an immediate occurrence (for example, the generation of a trace).

By default, the FDDI line generates an SRF announcement frame for its implemented events (for example, high bit errors, topology changes, trace status events, MAC frame error condition, and MAC duplicate address condition).

You can disable or enable SRFs for this circuit only by using Site Manager. We recommend enabling SRFs to ensure that your FDDI network is ANSI-compliant.

Using Site Manager

Complete the tasks in the following table to enable or disable SRFs for this circuit.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **SMT Attributes**.	The FDDI SMT Attributes window opens.
5. Set the **Status Report Protocol** parameter. Click on **Help** or see the parameter description on page A-7.	

(continued)

Site Manager Procedure *(continued)*	
You do this	**System responds**
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Enabling or Disabling Duplicate Addressing

By default, the router implements an optional ANSI duplicate address test involving periodic transmission of Network Service Address Network Interface Function (NSA NIF) frames to the source.

You can disable or enable duplicate addressing on an interface.

Using the BCC

To enable duplicate addressing on an interface, access an existing FDDI line service and enter:

promiscuous enable

To disable duplicate addressing on an interface, access an existing FDDI line service and enter:

promiscuous disable

For example, to enable duplicate addressing:

```
box> fddi slot 11 connector 1
fddi/11/1> promiscuous enable
```

Using Site Manager

Complete the tasks in the following table to enable or disable duplicate addressing on an interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **SMT Attributes**.	The FDDI SMT Attributes window opens.
5. Set the **Duplicate Address Protocol** parameter. Click on **Help** or see the parameter description on page A-8.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Entering User Data

You can enter up to 32 alphanumeric characters of site-specific information to be attached to the status information frames (SIFs) on this interface. You can do this only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to enter information to be attached to the the SIFs on this interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **SMT Attributes**.	The FDDI SMT Attributes window opens.
5. Set the **User Data** parameter. Click on **Help** or see the parameter description on page A-7.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Editing the MAC LLC Attributes

The FDDI media access control (MAC) standard defines the timed-token protocol, frame and token construction and transmission on the FDDI ring, ring initialization, and fault isolation.

Enabling or Disabling MAC LLC

When the ring becomes operational, the FDDI interface exchanges Logical Link Control (LLC) Protocol Data Units (PDUs) between the MAC and the local LLC entity. You can enable or disable transmission of PDUs on an interface only by using Site Manager.

Note: Enabling or disabling transmission of PDUs does not affect transferring and receiving MAC or SMT frame types.

Using Site Manager

Complete the tasks in the following table to enable or disable transmission of PDUs on an interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **MAC Attributes**.	The FDDI MAC Attributes window opens.
5. Set the **LLC Data Enable** parameter. Click on **Help** or see the parameter description on page A-8.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Editing FDDI Path Attributes

FDDI nodes exchange frames using the Timed-Token Protocol (TTP). The TTP defines how the token target rotation time (TTRT) is set, the length of time a node can hold the token, and how a node initializes the ring.

Each node is responsible for monitoring the integrity of the ring. By using a minimum valid transmission time (TVX), nodes can detect a break in ring activity. If the interval between token receptions exceeds the value of the TVX, the node reports an error condition and initiates the claim process to restore ring operation.

The TTRT carried in claim frames issued by the FDDI station are known as path attributes. Figure 3-2 illustrates their relationship.

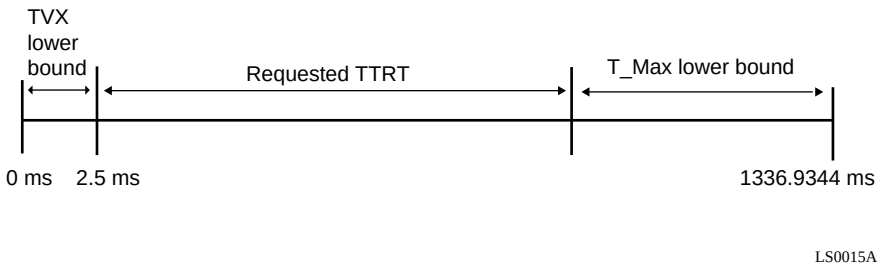

Figure 3-2. Range of Values for FDDI Path Attributes

You can set FDDI path attributes by:

- Specifying the Minimum TVX
- Specifying the Maximum TTRT
- Specifying the Requested TTRT

Specifying the Minimum TVX

The minimum TVX must be:

- Greater than zero
- Less than the Requested TTRT value

By default, the minimum TVX is 2.5 ms. See Figure 3-2 for the range of values for TVX lower bound, in relation to the other TTRT parameters.

You can set the minimum TVX only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to set the minimum TVX.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **Path Attributes**.	The FDDI Path Attributes window opens.
5. Set the **Tvx Lower Bound (ms)** parameter. Click on **Help** or see the parameter description on page A-9.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying the Maximum TTRT

The maximum TTRT value must be:

- Greater than or equal to 10 ms
- Greater than or equal to the value of the requested TTRT
- Less than or equal to 1336.9344 ms

See Figure 3-2 on page 3-19 for the range of values for the maximum TTRT, in relation to the other TTRT values.

You can specify the maximum TTRT value only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to set the maximum TTRT value.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **Path Attributes**.	The FDDI Path Attributes window opens.
5. Set the **T_Max Lower Bound (ms)** parameter. Click on **Help** or see the parameter description on page A-9.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying the Requested TTRT

The requested TTRT value must be:

- Greater than the minimum TVX
- Less than or equal to the maximum TTRT

Caution: Be extremely careful when editing FDDI path parameters such as Requested TTRT. Change the default values only if the network is part of a production or other specialized environment that requires customizing the parameters.

Refer to Figure 3-2 on page 3-19 for the valid range of values for Requested TTRT, in relation to the other TTRT values.

You can set the Requested TTRT value only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to set the Requested TTRT value.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **Path Attributes**.	The FDDI Path Attributes window opens.
5. Set the **Requested TTRT (ms)** parameter. Click on **Help** or see the parameter description on page A-10.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Editing FDDI Port Attributes

Port attributes report the connection capabilities of a FDDI port, including the link error rate (LER).

A status report frame (SRF) can contain link error monitor (LEM) status indicating the number of times that a link has been rejected. This is used to keep track of the link error rate (LER).

You can configure the LER by:

- Specifying the LER Cutoff
- Specifying the LER Alarm

Specifying the LER Cutoff

The LER cutoff is an estimate at which a link connection will be broken. The LER cutoff ranges from 10^{-4} to 101^{-5} and is reported as the absolute value of the base 10 logarithm. By default, the LER cutoff is 10^{-7}.

You can specify the LER cutoff only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to set the LER cutoff.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **Port Attributes**.	The FDDI Port Attributes window opens.
5. Set the **LER Cutoff** parameter. Click on **Help** or see the parameter description on page A-10.	

(continued)

Site Manager Procedure *(continued)*	
You do this	**System responds**
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying the LER Alarm

The LER alarm rate is an estimate at which a link connection generates an alarm. The LER alarm ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm of the estimate. By default, the LER alarm is 10^{-8}.

You can specify the LER alarm rate only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to set the LER alarm rate.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **FDDI** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit FDDI Parameters window opens.
3. Choose **Expert**.	The FDDI Advanced Attributes window opens.
4. Choose **Port Attributes**.	The FDDI Port Attributes window opens.
5. Set the **LER Alarm** parameter. Click on **Help** or see the parameter description on page A-10.	
6. Click on **OK**.	Site Manager returns you to the FDDI Advanced Attributes window.

(continued)

Site Manager Procedure *(continued)*	
You do this	**System responds**
7. Click on **Done**.	Site Manager returns you to the Edit Connector window.
8. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

The Transmit Queue Length

The transmit queue length determines the number of buffers that can be used to transmit data. Set the value from 0 to 255 to determine the transmit queue length. If you set the value larger than the compiled ring size, the router will truncate the value at that size.

You can set the transmit queue length only by using the BCC.

Using the BCC

To set the transmit queue length, access an existing Ethernet line service and enter:

transmit-queue-length *<integer>*

<integer> is a value between 0 and 255.

For example, to set the transmit queue length to 100:

```
box> ethernet slot 13 connector 1
ethernet/13/1> transmit-queue-length  100
```

The Receive Queue Length

The receive queue length determines the number of buffers that can be used to receive data. Set the value from 0 to 255 to determine the receive queue length. If you set the value larger than the compiled ring size, the router will truncate the value at that size.

You can set the receive queue length only by using the BCC.

Using the BCC

To set the receive queue length, access an existing Ethernet line service and enter:

receive-queue-length *<integer>*

<integer> is a value between 0 and 255.

For example, to set the receive queue length to 100:

```
box> ethernet slot 13 connector 1
ethernet/13/1> receive-queue-length  100
```

Chapter 4
Configuring Token Ring Services

Topic	Page
About Bay Networks Token Ring Media	4-2
Enabling or Disabling a Token Ring Interface	4-2
Specifying a MAC Address Override	4-3
Specifying a MAC Address Source	4-4
Specifying the Ring Speed	4-5
Enabling or Disabling Early Token Release	4-7

Summary of Token Ring Services

This chapter describes how to customize the physical and link layers for token ring interfaces. Table 4-1 shows the token ring functions you can configure. A check mark (✓) across from a particular function means that you can configure that function with the tool that is checked off.

Table 4-1. Token Ring Functions

Function	BCC	Site Manager
Enabling or Disabling a Token Ring Interface	✓	✓
Specifying a MAC Address Override		✓
Specifying a MAC Address Source		✓
Specifying the Ring Speed	✓	✓
Enabling or Disabling Early Token Release		✓

About Bay Networks Token Ring Media

Token ring is a 4 or 16 Mb/s token-passing, baseband LAN that operates in a ring topology that conforms to the IEEE 802.5 standard. It is compatible with IEEE 802.2 Type 1 (connectionless) and Type 2 (connection-oriented) support.

A token ring LAN uses shielded or unshielded twisted pair cable; the interface supports IBM Type 1 and Type 3 cabling.

Enabling or Disabling a Token Ring Interface

The router enables token ring line services when you add the circuit. You can disable and enable the interface without moving physical cabling.

Using the BCC

To enable token ring line services, access an existing token ring line service and enter:

enable

To disable token ring line services, access an existing token ring line service and enter:

disable

For example, to enable a token ring interface:

```
box> tokenring slot 9 connector 1
fddi/11/1> enable
```

Using Site Manager

Complete the tasks in the following table to enable or disable a token ring interface.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **TOKEN** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit Token Ring Parameters window opens.
3. Set the **Enable** parameter. Click on **Help** or see the parameter description on page page A-11.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying a MAC Address Override

To specify a MAC address for an interface (for example, to avoid host number conflicts on a directly connected IPX or XNS network), enter the 48-bit MAC address in MSB format; that is, enter 0x followed by 12 hexadecimal digits.

If you want the router to generate the MAC address for this token ring interface, do not change this parameter from its default value of zero.

If you enter a MAC address with this parameter, you must set the MAC Address Source to CNFG, as described in "Specifying a MAC Address Source," on page 4-4.

You can specify a MAC address override only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to specify a MAC address override.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **TOKEN** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit Token Ring Parameters window opens.
3. Set the **MAC Address Override** parameter. Click on **Help** or see the parameter description on page A-11.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying a MAC Address Source

By default, the token ring interface uses the MAC address stored in the programmable read-only memory (PROM) on the link module.

You can set the source for MAC addresses on a token ring interface to:

- BOXWIDE -- The interface uses a MAC address that the software generates from the router's serial number.
- PROM -- The interface uses a MAC address from the PROM on the token ring link module.
- CNFG -- You explicitly assign a MAC address with the MAC Address Override parameter.

You can set the source for MAC addresses on a token ring interface only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to set the source for MAC addresses.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **TOKEN** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit Token Ring Parameters window opens.
3. Set the **MAC Address Select** parameter. Click on **Help** or see the parameter description on page A-12.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Specifying the Ring Speed

You can set the ring speed for a token ring interface to 4 or 16 Mb/s. By default, the ring speed is 16 Mb/s.

If you use 16 Mb/s, the router enables the early token release protocol, which is used extensively on 16 Mb/s media. In the unlikely event that you want to disable early token release over 16 Mb/s token ring media, disable early token release as described in the next section.

Using the BCC

To set the ring speed for a token ring interface, access an existing token ring line service and enter:

speed *<value>*

<value> is either 4 Mb or 16 Mb.

For example, to set the ring speed to 16 Mb:

```
box> tokenring slot 9 connector 1
fddi/11/1> speed 16
```

Using Site Manager

Complete the tasks in the following table to set the ring speed.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **TOKEN** Connector**.**	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit Token Ring Parameters window opens.
3. Set the **Speed** parameter. Click on **Help** or see the parameter description on page A-12.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Enabling or Disabling Early Token Release

Early token release indicates that the token can return to the ring before the recipient copies all data. By default, Site Manager enables early token release on an interface.

You can disable or enable early token release on an interface only when the Ring Speed is 16 Mb/s and only by using Site Manager.

Using Site Manager

Complete the tasks in the following table to enable or disable early token release.

Site Manager Procedure	
You do this	**System responds**
1. In the Configuration Manager window, choose a **TOKEN** Connector.	The Edit Connector window opens.
2. Choose **Edit Line**.	The Edit Token Ring Parameters window opens.
3. Set the Early Token Release parameter. Click on **Help** or see the parameter description on page A-13.	
4. Click on **OK**.	Site Manager returns you to the Edit Connector window.
5. Click on **Done**.	Site Manager returns you to the Configuration Manager window.

Appendix A
Site Manager Line Services Parameters

This appendix contains reference information on Site Manager Line Service parameters in the following sections:

- CSMA/CD Line Parameters
- FDDI Line Parameters
- Token Ring Line Parameters

For each parameter associated with a physical layer protocol, this appendix provides the Site Manager menu path to each parameter, information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the MIB object ID.

CSMA/CD Line Parameters

Parameter:	**Enable**
Path:	Configuration Manager > **XCVR** Connector > **Edit Line** > Edit CSMA/CD Parameters
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables this Ethernet line.
Instructions:	Select Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.4.1.1.2

Parameter: BofL Enable

Path: Configuration Manager > **XCVR** Connector > **Edit Line** > Edit CSMA/CD Parameters

Default: Enable

Options: Enable | Disable

Function: When set to Enable, the router sends BofL polling messages from this system to all systems on the local network.

Instructions: Set to Enable or Disable. We recommend that you enable BofL.

MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.7

Parameter: BofL Timeout

Path: Configuration Manager > **XCVR** Connector > **Edit Line** > Edit CSMA/CD Parameters

Default: 5

Options: 1 to 60 seconds

Function: Specifies the time between transmissions of Breath of Life messages from this Ethernet interface. Timeout will occur if five periods elapse without a successful BofL message transmission. When timeout occurs, the router disables and reenables the Ethernet interface.

This parameter is valid only if you set BofL Enable to Enable.

Instructions: Accept the default BofL timeout of 5 seconds, or specify a new value up to 60 seconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.8

Parameter: **Hardware Filter**

Path: Configuration Manager > **XCVR** Connector (10BASE-T only) > **Edit Line** > Edit CSMA/CD Parameters

Default: Disable (the default changes to Enable when, while adding the circuit, you reply OK to the prompt:
`Do you want to enable Hardware Filters on this circuit?`)

Options: Enable | Disable

Function: Enables filtering hardware in the link or net module to drop local frames at the interface instead of copying them into system memory. Enabling hardware filters improves bridging software performance because router resources are not used to receive and reject local frames.

Instructions: Set to Enable only if you enabled the bridge software and the link or net module has hardware filters.

MIB Object ID: 1.3.6.1.4.1.18.3.4.1.1.29

FDDI Line Parameters

Parameter: **Enable**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables the FDDI circuit for the selected connector.

Instructions: Set to Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.2

Parameter: **BofL Enable**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables BofL polling.

When you set both this parameter and the LLC Data Enable parameter to Enable, the router disables the LLC interface after the time you specify using the BofL Timeout parameter if the link becomes unavailable.

When you set this parameter to Disable, the router disables the LLC interface immediately after the link becomes unavailable.

Instructions: Set to Enable or Disable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.7

Parameter: **BofL Timeout**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: 3

Options: 1 to 60 seconds

Function: When BofL is enabled and the link becomes unavailable, this parameter specifies the time Site Manager waits before disabling the LLC interface.

Instructions: Accept the default value, 3 seconds, or specify a new value. Be sure to set the BofL Enable parameter to Enable.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.8

Parameter: Hardware Filter

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters

Default: Disable (the default changes to Enable when, while adding the circuit , you reply OK to the prompt:
`Do you want to enable Hardware Filters on this circuit?`)

Options: Enable │ Disable

Function: When you set this parameter to Enable, the link module filtering hardware, if present, does not allow the router to copy local frames into memory. In essence, the filtering hardware drops local frames at the interface. Hardware filtering improves performance because the bridging software no longer uses resources to receive and reject those frames.

Instructions: Set to Enable only if the link module has hardware filters and you enabled bridge software.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.37

Parameter: **Connection Policy**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **SMT Attributes** > FDDI SMT Attributes

Default: 0xFF65

Options: 0x0 to 0xFFFF

Function: Specifies the connection policies this line requests at the FDDI station.

The policy descriptor takes the form "rejectX-Y" where X denotes the physical connection (PC) type of the local port, and Y denotes the PC type of the neighbor port. X and Y can have the following values:

- A -- Indicates that the port is a dual-attachment station or concentrator that attaches to the primary IN and the secondary OUT when attaching to the dual FDDI ring
- B -- Indicates that the port is a dual-attachment station or concentrator that attaches to the secondary IN and the primary OUT when attaching to the dual FDDI ring
- S -- Indicates a port in a single-attachment station or concentrator
- M -- Indicates a port in a concentrator that serves as a master to a connected station or concentrator

Instructions: Specify the status word value that represents the connection policies you want this line to reject. Start with a value of zero for the status word (all bits set to 0). For each connection policy you want the node to reject, add to the status word value the number 2 raised to a power specified in Table 3-2 on page 3-10. This is equivalent to setting a bit to 1 for each policy that you want the node to reject.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.30

Parameter: **T_Notify Timeout**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **SMT Attributes** > FDDI SMT Attributes

Default: 22

Options: 2 to 30 seconds

Function: Specifies the interval between successful iterations of the Neighbor Notification Protocol.

Instructions: Accept the default value of 22 seconds or specify a new value from 2 to 30 seconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.31

Parameter: User Data

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **SMT Attributes** > FDDI SMT Attributes

Default: None

Options: Any string up to 32 alphanumeric characters

Function: Allows you to enter additional information about the router. This information is attached to the status information frames (SIFs).

Instructions: Enter up to 32 alphanumeric characters.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.8

Parameter: Status Report Protocol

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **SMT Attributes** > FDDI SMT Attributes

Default: Enable

Options: Enable | Disable

Function: Specifies whether the node will generate Status Report Frames (SRFs) for its implemented events (for example, high bit errors, topology changes, trace status events, MAC frame error condition, port LER condition, and MAC duplicate address condition).

Instructions: Accept the default, Enable, if you want the node to generate SRFs; specify Disable if you do not want the node to generate SRFs. We recommend using Enable to ensure that your FDDI network is ANSI-compliant.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.14

Parameter: Trace Max Expiration (ms)

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **SMT Attributes** > FDDI SMT Attributes

Default: 7000

Options: 6001 to 256000 milliseconds

Function: Specifies the maximum propagation time for a trace on an FDDI topology.

Instructions: Enter a value from 6001 to 256000. We recommend accepting the default value of 7000 milliseconds (7 seconds).

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.15

Parameter: Duplicate Address Protocol

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **SMT Attributes** > FDDI SMT Attributes

Default: Enable

Options: Enable | Disable

Function: Implements an optional ANSI duplicate address test involving periodic transmission of Network Service Address Network Interface Function (NSA NIF) frames to the source.

Instructions: Accept the default, Enable, if you want to test for duplicate addresses. Specify Disable if you do not want to test for duplicate addresses.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.1.3.1.18

Parameter: LLC Data Enable

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **MAC Attributes** > FDDI MAC Attributes

Default: Enable

Options: Enable | Disable

Function: Specifies whether the MAC is available to transmit and receive Logical Link Control (LLC) Protocol Data Units (PDUs). If you accept Enable, the interface to the MAC entity is available to exchange PDUs between the MAC and the local LLC entity when the ring becomes operational. Setting this attribute does not affect transferring and receiving MAC or SMT frame types.

Instructions: Accept the default, Enable, if you want the MAC available for transmitting and receiving LLC PDUs; specify Disable if you do not want the MAC available for transmitting and receiving LLC PDUs.

MIB Object ID: 13.6.1.4.1.18.3.4.15.2.3.1.17

Parameter: **Tvx Lower Bound (ms)**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Path Attributes** > FDDI Path Attributes

Default: 2.5

Options: The value (in milliseconds) must be greater than zero and less than the value of Requested TTRT. If the value of Requested TTRT is greater than 5.2 ms, set this parameter to a value less than or equal to 5.2 ms. For example, if the value of Requested TTRT is 165 ms, the value for Tvx Lower Bound must be less than or equal to 5.2 ms.

Function: Specifies the minimum time value of the Valid Transmission Timer (TVX).

Instructions: Accept the default value of 2.5 milliseconds or specify a new value less than or equal to 5.2 milliseconds and less than the value of Requested TTRT.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.3.3.1.5

Parameter: **T_Max Lower Bound (ms)**

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Path Attributes** > FDDI Path Attributes

Default: 165

Options: 10 to 1336.9344 ms

Function: Allows you to specify the maximum time value of TTRT. The value (in milliseconds) must be greater than or equal to 10 ms, greater than or equal to the value of the Requested TTRT (ms) parameter, and less than or equal to 1336.9344 ms.

Instructions: Accept the default value of 165 ms, or specify a new value less than or equal to 1336.9344 ms and greater than or equal to the value of the Requested TTRT (ms) parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.3.3.1.6

Parameter: Requested TTRT (ms)

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Path Attributes** > FDDI Path Attributes

Default: 165

Options: Variable. This value (in milliseconds) must be greater than the value specified for the TVX Lower Bound (ms) parameter and less than or equal to the value specified for the T_Max Lower Bound (ms) parameter.

Function: Specifies the target token rotation time carried in claim frames issued by the FDDI station.

Instructions: Accept the default of 165 ms or enter a new value in milliseconds.

MIB Object ID: 1.3.6.1.4.1.18.3.4.4.1.32

Parameter: LER Cutoff

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Port Attributes** > FDDI Port Attributes

Default: 7

Options: 4 to 15

Function: Specifies the link error rate estimate at which a link connection is broken. It ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm.

Instructions: Accept the default value of 7 or specify a new value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.4.3.1.17

Parameter: LER Alarm

Path: Configuration Manager > **FDDI** Connector > **Edit Line** > Edit FDDI Parameters > **Expert** > **Port Attributes** > FDDI Port Attributes

Default: 8

Options: 4 to 15

Function: Specifies the link error rate estimate at which a link connection generates an alarm. It ranges from 10^{-4} to 10^{-15} and is reported as the absolute value of the base 10 logarithm of the estimate.

Instructions: Accept the default value of 8 or specify a new value.

MIB Object ID: 1.3.6.1.4.1.18.3.4.15.4.3.1.18

Token Ring Line Parameters

Parameter: Enable

Path: Configuration Manager > **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: Enable

Options: Enable | Disable

Function: Enables or disables the token ring circuit.

Instructions: Set to Disable if you want to disable the token ring circuit.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.2

Parameter: MAC Address Override

Path: Configuration Manager > **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: None

Options: Any valid, 48-bit MAC-level address

Function: Assigns a user-specified MAC address.

Instructions: If you want the router to generate the MAC address for this token ring interface, ignore this parameter.

If you want to specify a MAC address (for example, to avoid host number conflicts on a directly connected IPX or XNS network), enter the 48-bit MAC address in MSB format; that is, enter 0x followed by 12 hexadecimal digits.

If you enter a MAC address with this parameter, you must set the MAC Address Select parameter to CNFG.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.9

Parameter: **MAC Address Select**

Path: Configuration Manager > **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: PROM

Options: BOXWIDE | PROM | CNFG

Function: Determines the source of the MAC address.

Instructions: Enter BOXWIDE if you want the token ring interface to use a MAC address that the software generates from the router's serial number.

Enter PROM if you want the token ring interface to use a MAC address from programmable read-only memory on the token ring link module.

Enter CNFG if you explicitly assigned a MAC address with the MAC Address Override parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.10

Parameter: **Speed**

Path: Configuration Manager > **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters

Default: 16

Options: 16 Mb/s | 4 Mb/s

Function: Specifies the speed of the token ring media. If you select 16 Mb/s, the router enables the Early Token Release protocol, which is used extensively on 16 Mb/s media. In the unlikely event that you want to disable early token release over 16 Mb/s token ring media, you can do so with the Early Token Release parameter.

Instructions: Enter the ring speed.

MIB Object ID: 1.3.6.1.4.1.18.3.4.2.1.11

Parameter:	**Early Token Release**
Path:	Configuration Manager > **TOKEN** Connector > **Edit Line** > Edit Token Ring Parameters
Default:	Enable
Options:	Enable | Disable
Function:	Indicates whether the token can return to the ring before the recipient copies all data. This parameter is valid only when you set the Speed parameter to 16 Mb/s.
Instructions:	Accept the current value.
MIB Object ID:	1.3.6.1.4.1.18.3.4.2.1.12

Appendix B
Default Line Parameter Settings

Tables B-1 to B-7 show the default settings for LAN line attribute parameters, in the following sections:

- Ethernet (CSMA/CD) Line Parameters
- FDDI Line Parameters
- Token Ring Line Parameters

You can use the Configuration Manager to edit any of the default settings.

Ethernet (CSMA/CD) Line Parameters

Table B-1. Ethernet Line Parameters

Parameter	Default
Enable	Enable
BofL Enable	Enable
BofL Timeout	5 (4 with router redundancy enabled)
Hardware Filter (10 Mb/s Ethernet only)	Disable

FDDI Line Parameters

Table B-2. FDDI Line Parameters

Parameter	Default
Enable	Enable
BofL Enable	Enable
BofL Timeout	3 s
Hardware Filter	Disable (this default is changed to Enable if you add a circuit and reply OK to the prompt, `Do you want to enable Hardware Filters on this circuit?`)

Table B-3. FDDI SMT Attribute Parameters

Parameter	Default
Connection Policy	0xFF65
T_Notify Timeout (s)	22 s
Trace Max Expiration (ms)	7000 ms (7 s)
Status Report Protocol	Enable
Duplicate Address Protocol	Enable
User Data	None

Table B-4. FDDI MAC Attribute Parameter

Parameter	Default
LLC Data Enable	Enable

Table B-5. FDDI Path Attribute Parameters

Parameter	Default
Tvx Lower Bound (ms)	2.5 ms
T_Max Lower Bound (ms)	165 ms
Requested TTRT (ms)	165 ms

Table B-6. FDDI Port Attribute Parameters

Parameter	Default
LER Cutoff	7
LER Alarm	8

Token Ring Line Parameters

Table B-7. Token Ring Line Parameters

Parameter	Default
Enable	Enable
MAC Address Override	None
MAC Address Select	PROM
Speed	16 MB/s
Early Token Release	Enable

Glossary

Attribute	See *parameter*. Properties or functional aspects of a configurable MIB object.
Channel	The multiplexed signal for one voice or data conversation, running simultaneously with other channels over a single logical or physical line.
Circuit	A data communication path established between two network hosts; for example, a permanent or switched virtual circuit (PVC or SVC) over a packet- or cell-switched network, or over a dial or leased-line connection.
Connector	The physical and electrical means to interconnect an interface module in a network device directly or indirectly to a physical network medium.
Interface	A data link/physical layer connection to a physical network transmission medium. An interface includes media-specific driver software.
Line	The physical medium that completes a circuit path, identified typically by connector, slot, and media type. In a *multiline* circuit, one circuit uses multiple lines for added bandwidth.
Logical Line	See *line*. A logical path on a physical circuit.
Parameter	See *attribute*. A Site Manager variable that defines a specific MIB attribute or set of MIB attributes.
Port	See *connector*. On a network device or a user end station, a logical point of termination for data sent or received by a specific protocol or application.
Slot	The physical and electrical means to interconnect an interface module in a network device directly or indirectly to a physical network medium.

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